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ABSTRACT

The study explored the differences in the abilities of 20 learning disabled (LD) students (6-8 years old) and 19 normal Ss to perform on listening tasks. In phase I, performance levels were assessed on the Goldman Fristoe Woodcock Test of Auditory Discrimination and a listening comprehension skill battery (the Durrell Listening-Reading Series, Primary Level, Form EF, Parts I and II). In phase II, Ss' error frequency under varying conditions of rate altered speech was analyzed. Among results were that there was no significant difference in the performance of LD and normal Ss in the assessment testing of auditory discrimination and sentence comprehension, although there was a significant difference in vocabulary understanding; and that there were no significant differences between the number of errors made by LD and normal Ss at the slow or normal rate of speed after controlling for IQ, although there was a significant difference at the fast rate. (CL)

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THE EFFECTS OF RATE CONTROLLED SPEECH ON THE LISTENING COMPREHENSION OF LEARNING DISABLED AND NORMAL CHILDREN

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Numerous researchers have demonstrated that listening comprehension does affect cognition and academic performance. Preschoolers who are delayed in the use of auditory stimuli are seen as having difficulty attaching sounds to objects, sequencing events of a story, as well as in counting and alphabet recitation (Prise, 1970). Vogel (1974), in her research with preschoolers, predicted reading disorders through oral language disabilities. Atheny (1971), Lerner (1972), Ruddell (1970), and Vogel (1974) all discuss reading disabilities and state that the language modeling that underlies reading is directly related to the listening comprehension process.

Myklebust (1973) states that it appears that the learning disabled child is delayed in written language because of his limitations in reading and that read language is deficient because of disorders in auditory language or listening. Therefore, a processing disorder in the area of listening comprehension would affect all other learning.

Listening comprehension, although listed as the most basic and primary receptive level, is not according to Wiig and Semel (1976) a simple stimulus-response mechanism but hierarchy within itself. They state that an in-depth analysis of the nature and extent of listening comprehension deficits in youngsters with learning disabilities requires attention to the following major areas:

1. Sensory processing of auditory input
2. Perceptual processing
3. Linguistic processing
4. Cognitive semantic processing

Frequently the child with learning disabilities is described as being slower and developmentally behind those described as normal (Bryan & Bryan, 1975; Lerner, 1976). Hinsie and Campbell (1960) describe youngsters with psychosensory learning disorders as those who cannot perceive and interpret sensation properly. This slow performance is described as stemming from the inability to synthesize and shift from one modality to another, interfering with the decision making and thought processes. Miller (1956), Newell and Simon (1972) have explored the quantity and rate of auditory stimuli that can be held and organized in the short term memory. These relationships of capacity and rate should then be related to the perceptual, linguistic and logical ability to process thought by the learning disabled child (Wiig & Semel, 1973).

Few studies have explored the effects of changing the rate of stimuli in an attempt to determine the processing speed of the learning disabled and even these results have been confounded and confusing. Ankrom (1973), Broski (1974), Mahaney (1975), and McCroskey and Thompson (1973) all report adapting the speed of auditory instruction in order to effectively change the listening comprehension of learning disabled children who ranged from kindergarten to adolescence. Although the label provided was usually brain damaged-learning disabled, all youngsters were seen to be significantly behind in academic achievement. The basic results of these studies indicated that the child who was presented auditory stimuli at 275 words per minute, the faster rate, was significantly less accurate on comprehension questions when comparing this to other rates

presented. McCroskey and Thompson (1973) found that younger children increased their ability to listen and comprehend when presented sentences in expanded or slowed speech. Given population definitions of brain damage vs. normal (Ankron) and visual vs. auditory learners (Broski) no significant difference was seen in the child's ability to comprehend rate altered speech. Broski (1975) sorted his subjects into auditory and visual learners using the Illinois Test of Psycholinguistic Abilities and determined a response strength through a deviation score. His method of response required a cloze questioning technique. This made the subjects express themselves, adding an additional response requirement. Mahaney (1975) trained learning disabled adolescents to listen to compressed speech. She reported that they could double their listening rate after a year's training and seemed to retain their level of comprehension. She reports no analytical data.

Therefore, there is confusion in the literature as to the effects of rate of presentation on the listening comprehension of learning disabled and normal children.

THE STUDY

Introduction

This study was designed to explore the differences in the abilities of the learning disabled and normal child to perform on listening tasks. The attempt was to determine the differences between the performance of these populations on a listening assessment battery including auditory discrimination, vocabulary listening and sentence listening. Population differences were

determined by assessing the ability to comprehend rate altered speech at a slow, normal and fast rate of presentation.

The relationship between information gained on the listening assessment battery and the child's error frequency under varying conditions of rate altered speech was then analyzed.

The Population

The subjects for the study were obtained from the available population at The Howard School which is a private school for learning disabled children and a United Way Agency, along with the first through third grades of the Winnona Park School, an elementary school. Criteria for inclusion in the study stated that each child would be a white male, in the middle socioeconomic class and would be between 6.0 to 8.11 years of age.

The learning disabled child was defined as one who exhibited normal intelligence as determined by an intelligence quotient (IQ) of 85 or higher, but had shown significant learning problems especially in the area of reading so that this subject scored with a Learning Expectancy Quotient (LEQ) of 89 or below. The LEQ level was calculated using the Peabody Picture Vocabulary Test intelligence score and level of reading achievement as determined on the Metropolitan Achievement Test. The LEQ was computed by a modified Myklebust formula. An additional criterion stated that the child's difficulty must be severe to the point that a self contained classroom for the learning disabled was required. All learning disabled subjects were therefore students at The Howard School.

The normal population was defined as those white males exhibiting normal intelligence and experiencing no difficulty in their academic skills, especially in the field of reading. In the same manner they received a Learning Expectancy Quotient of 90 or above. Parental permission was obtained for each child in the study. Forty-eight children from both samples entered the study to be screened by the intake battery to qualify for fit into the sample populations. Twenty learning disabled and nineteen normal subjects qualified for the study.

PHASE I

Procedure

Performance levels of the learning disabled and normal child were assessed in the following manner:

Auditory Discrimination

The Goldman Fristoe Woodcock Test of Auditory Discrimination (GFW) was given to each subject individually. This assessment was used to determine if there was any relationship between the learning disabled and normal child's ability to discriminate sound. Each child listened to the tape through a headset. An easel presented four pictures on one plate. Each picture represented a word that was phonemically close to every other. The child had to decide what word was pronounced and point to his selection.

Listening Comprehension Skill Batteries

The Durrell Listening-Reading Series, Primary Level, Form EF, Part I: Vocabulary Listening (LCV) and Part II: Sentence Listening (LCS) were given to all subjects.

Part I: Vocabulary listening was designed to tap the child's ability to relate a word to one of three categories in a cluster. Each category was represented by a drawing. The task involved attending skills used in following directions. Auditory memory skills were also used to retain the categories that were presented.

Part II: Sentence Listening was designed to assess the child's ability to relate a dictated sentence to one of three topic areas. The child not only had to attend to the sentence in its entirety, but had to categorize the implication of its meaning. All directions were tape recorded in standard English at normal speed in order that each child received the same aural stimuli.

PHASE II

The following methods were used to determine the effect of the rate of oral presentation on the child's error frequency when asked comprehension questions. The entire population was divided into groups of 4 or 5 subjects. These small groups met for approximately one-half hour daily. The table was set with a carrel and a chair for each child. In front of the child was placed a headset, a felt pen and two booklets with the subject's number in the upper left corner. Each story had its own response booklet. The booklets were multicolored and included pictures drawn to illustrate the story.

Each subject heard fourteen stories selected from the Early Approaches to Reading Skills series. The first two were on the kindergarten level of difficulty and were used as pre-test samples to familiarize the subjects with the material and the

format of response. The subsequent stories were presented in groups of four at the slow, normal and fast rate. Although every subject heard all fourteen stories, the order of presentation of the sequence of the rates was varied to control for the order effect. The rate and story presented included:

Pre-Test	Stories 1, 3	normal rate	(1.0 compression)
	Stories 7, 9, 16, 18	slow rate	(0.5 compression)
	Stories 8, 10, 13, 20	normal rate	(1.0 compression)
	Stories 6, 11, 14, 19	fast rate	(1.5 compression)

Eight questions appropriate to the difficulty of the story are asked for each presentation. At the easier level, the questions are interspersed throughout the story and by the last or third grade difficulty level the questioning is held until the end. The questions were phrased in such a way that the child was required to draw a circle around the picture that represented the correct answer.

Controlled Rate Production

In order to gain precise control over the presentation of the material, each story was reproduced by the Varispeech II recorder, a product of the Lexicon Company. In this manner, the speech at which the child heard the story was instrumentally controlled. A multi-set transmitter system was plugged into the recording mechanism which enabled as many as eight headsets to be directly connected to the machine. In this manner each child in the group received the same stimuli at the same time.

For speeds recorded at 1.5 compression or fast rate, the device played every other segment of the tape. In this manner, the one second production was reduced to a half of a second of stimuli. For rates presented at .5 compression, or slow rate, the device recorded a miniscule pause between every other segment. The one second production, therefore, was expanded to one and a half times its original length.

The final population sample included twenty learning disabled subjects and nineteen normal subjects. The duration of the study went from August 30, to December 1, 1977, and included approximately 7.5 hours of contact time per child.

At the conclusion of the study, each child's classroom teacher received a synopsis sheet describing the results obtained by that child to be added to each subject's file. It was hoped that in this manner they too could benefit from the child's participation in the study.

RESULTS

Testing the Relationship of Assessment Tests to Population: Phase I

Ho1: There is no significant difference between the learning disabled and normal child's ability to perform on the assessment tests of a) auditory discrimination (GFW), b) vocabulary understanding (LCV) and c) sentence listening (LCS).

Due to the significant difference between the learning disabled and normal population on the intelligence measure, an

analysis of coovariance controlling for the intelligence factor was run to determine population differences on the assessment tests.

On the Goldman Fristoe Woodcock Test of Auditory Discrimination, there was no significant difference at the .05 level in the two populations when the effect of the intelligence covariate was removed. This is shown in Table 1.

The mean percentile score of the learning disabled population was 27.3 (s=4.9) and the mean percentile response of the normal population was 49.8 (s+2.0). The full data are reported in Table 1.

(Table 1)

On the sentence listening portion Part II, of the Durrell Listening-Reading Series, there was no significant difference between the abilities of the learning disabled and normal child when the effect of the intelligence covariate was removed. It is also interesting to note that in this case the IQ covariate was not significant. This data is presented in Table 1. The learning disabled child received a mean score of 32.3 (s=1.6) out of a possible 40 points and the normal population a 33.3 (s=1.8). There was very little variability in either population and the statistics are reported in Table 2.

(Table 2)

As there was no significant difference in the performance of the learning disabled and normal child in the assessment testing of auditory discrimination and sentence comprehension, the null hypotheses (Hol,a,c) in these two cases cannot be rejected. In the case of vocabulary understanding, however,

TABLE 1

Analysis of Covariance Between the Learning Disabled and Normal Population and the Assessment Battery Using IQ as the Covariate

GFWP
BY ID
WITH IQ AS THE COVARIATE

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
COVARIATE - IQ	4718.4	1	4718.4	6.4	.016
MAIN EFFECTS - ID	2260.6	1	2260.6	3.1	.088
EXPLAINED	6979.0	2	3489.5	4.8	.015
RESIDUAL	26398.9	36	733.3		
TOTAL	33377.9	38	878.4		

LCV
BY ID
WITH IQ AS THE COVARIATE

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
COVARIATE - IQ	2185.5	1	2185.5	8.0	.008
MAIN EFFECTS - ID	1637.9	1	1637.9	5.9	.020
EXPLAINED	3823.4	2	1911.7	6.9	.003
RESIDUAL	9912.9	36	275.4		
TOTAL	13736.3	38	361.5		

LCS
BY ID
WITH IQ AS THE COVARIATE

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
COVARIATE - IQ	173.8	1	173.8	3.2	.084
MAIN EFFECTS - ID	3.6	1	3.6	.1	.798
EXPLAINED	177.4	2	88.7	1.6	.213
RESIDUAL	1977.5	36	54.9		
TOTAL	2154.9	38	56.7		

TABLE 2

Learning Disabled and Normal Subjects

and the Assessment Battery

Variable	Number of Cases	Mean	Standard Deviation	Standard Error
GFW				
LD	20	27.3	25.3	5.7
Normal	19	49.8	30.1	6.9
LCV				
LD	20	65.1	21.9	4.9
Normal	19	82.8	9.1	2.1
LCS				
LD	20	32.2	7.3	1.6
Normal	19	33.3	7.9	1.8

there was a significant difference between populations and the null hypothesis (Hol,b) was rejected.

Testing the Relationship of Error Frequency at Rate of Speech to Population: Phase II

Ho2: There is no significant difference between the learning disabled and normal child's ability to comprehend stories presented at the altered speech rates of a) .5 (slow), b) 1.0 (normal) and c) 1.5 (fast) compression.

Due to the significant difference in IQ between the learning disabled and normal population, an analysis of covariance was run. Intelligence was controlled for in calculating the difference between population error means given the slow, normal and fast rates of presentation.

At the slow rate (.5) of speed there was no significant difference between the errors made by the learning disabled and normal child after controlling for IQ.

At the normal rate (1.0) of speed there was no significant difference between the number of errors made by the learning disabled and normal child after controlling for IQ.

At the fast rate (1.5) of speed there was a significant difference at the .01 level between the number of errors made by the learning disabled and normal child after controlling for IQ. These data are presented in Table 3.

(Table 3)

The learning disabled population had a mean error frequency of 3.9 at the slow rate, of 3.6 at the normal rate and of 5.5 at the fast rate. The normal population showed a mean error

TABLE 3

Analysis of Covariance Between the Learning Disabled and the Normal Population and the Error Frequency at Three Rates of Speech Using IQ as the Covariate

N
BY ID
WITH IQ AS THE COVARIATE FOR THE SLOW RATE

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
COVARIATE - IQ	35.6	1	35.6	3.6	.067
MAIN EFFECTS - ID	5.4	1	5.4	.5	.465
EXPLAINED	41.0	2	20.5	2.1	.143
RESIDUAL	359.3	36	10.0		
TOTAL	400.4	38	10.5		

N
BY ID
WITH IQ AS THE COVARIATE AT THE NORMAL RATE

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
COVARIATE - IQ	40.8	1	40.8	4.4	.043
MAIN EFFECTS - ID	20.6	1	20.6	2.2	.146
EXPLAINED	61.3	2	30.7	3.3	.048
RESIDUAL	334.4	36	9.3		
TOTAL	395.7	38	10.4		

N
BY ID
WITH IQ AS THE COVARIATE AT THE FAST RATE

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
COVARIATE - IQ	26.5	1	26.5	1.8	.184
MAIN EFFECTS - ID	115.8	1	115.8	8.0	.007
EXPLAINED	142.2	2	71.1	4.9	.013
RESIDUAL	518.8	36	14.4		
TOTAL	661.0	38	17.4		

frequency of 2.5 at the slow rate, 1.4 at the normal rate, and 1.7 at the fast rate. These statistics are presented in Table 4. The null hypotheses of Ho2,a,b cannot be rejected at the slow or normal rate of speech. The null hypothesis Ho2,c must be rejected, however, for the fast rate of speech as the population difference was significant.

(Table 4)

Ho3: There is no significant difference between the ability within each sub-population to comprehend stories presented at the altered speech rates of a) .5 (slow), b) 1.0 (normal) and c) 1.5 (fast) compression.

A t-test of statistical significance was run to determine the difference between the error frequency at the slow, normal and fast rate of compression for each sub-population. The learning disabled child had significantly more difficulty with the fast presentation than for any other rate. Although the normal population had errors at the slower rate, the difference was not statistically significant at the .05 level. These statistics are presented in Table 5.

(Table 5)

Testing the Relationship Between Assessment Testing and Error Frequency: Phase III

In addressing the relationship between the assessment testing and the error frequency in comprehending rate altered speech, the following hypotheses are reviewed:

Ho4: There is no relationship between a child's ability to perform on the assessment battery of GFW, LCV and LCS and the child's error frequency in the comprehension of stories presented at the slow, normal and fast rate of speech.

TABLE 4

Error Frequency of the Learning Disabled and Normal Populations at Three Rates of Speech

Rate Variable	Population	Number of Cases	$\bar{X}$	Standard Deviation	Standard Error
Slow	LD	20	3.9	3.9	.9
	Normal	19	2.5	2.3	.5
Normal	LD	20	3.6	3.7	.8
	Normal	19	1.4	2.3	.5
Fast	LD	20	5.5	4.9	1.1
	Normal	19	1.7	1.8	.4
Aggregated Across all Rates	LD	20	12.9	11.2	2.5
	Normal	19	5.6	5.4	1.2

TABLE 5

T-Test of Significance Between Rates

Within Sub-Populations

Sub-Pop.	Rate	N	$\bar{X}$	Standard Deviation	Critical t-Value .05 Level	Diff
LD	Slow	20	3.9	3.9		
					2.09	.3
	Normal	20	3.6	3.7		
					1.90*	1.9**
	Fast	20	5.5	4.9		
Normal	Slow	19	2.5	2.3		
					2.10	1.1
	Normal	19	1.4	2.3		
					2.10*	.3
	Fast	19	1.7	1.8		

* Due to different variances, a critical t-value was calculated using a correction factor. See Brunk, H. D. An Introduction to Mathematical Statistics, New York: Ginn & Co. 1960, p. 246.

** A difference in the $\bar{X}$ of 1.5 indicates a .05 level of significance.

A Pearson Produce Moment Correlation Coefficient was run to determine the relationship of the total number of errors made on the comprehension questions from the stories and the results the combined total sample population received on auditory discrimination (GFW), vocabulary understanding (LCV), and sentence listening (LCV).

With a correlation of -.487 on the auditory discrimination test, a correlation of -.625 on the vocabulary understanding and a correlation of -.5445 on the sentence understanding test there was a significant correlation at the .001 level. Therefore, there was a significant inverse relationship between the assessment battery and the error frequency at the three rates of speed. In all three cases the null hypothesis Ho4 was rejected. Statistics are presented in Table 6.

(Table 6)

For the sentence listening subtest, there was a correlation of -.5168 for the slow rate, -.7112 for the normal rate and -.7343 for the fast rate resulting in significance at the .01 level at all three rates.

Therefore, at a .05 significance level the null hypothesis Ho5 must be rejected in all cases. These data are presented in Table 7.

(Table 7)

Ho6: There is no relationship between the normal child's ability to perform on the assessment battery and the child's error frequency at three rates of speech.

Using a Pearson Product Moment Correlation Coefficient, the relationship between the normal child's score on the three

TABLE 6

Pearson Correlation Coefficient of Total Group Error to the Assessment Battery

GFW	corr.	-.487	sig.	.001
LCV	corr.	-.6257	sig.	.001
LCS	corr.	-.5445	sig.	.001

TABLE 7

Relationship of Errors at Three Rates to the Assessment Battery For the Learning Disabled Population

	Slow Rate		Normal Rate		Fast RAte	
GFW	corr.	-.6030	corr.	-.4605	corr.	-.4902
	sig.	.002	sig.	.021	sig.	.037
LCV	corr.	-.4925	corr.	-.4272	corr.	-.5175
	sig.	.014	sig.	.030	sig.	.010
LCS	corr.	-.5168	corr.	-.7112	corr.	-.7343
	sig.	.010	sig.	.001	sig.	.001

assessment tests and the subject's error frequency at each rate was analyzed.

Ho5: There is no relationship between the learning disabled child's ability to perform on the assessment battery and the child's error frequency at three rates of speech.

Using a Pearson Product Moment Correlation Coefficient, the relationship between the learning disabled child's score on the three assessment tests and his error frequency at each rate was analyzed. With a correlation of -.6030 at the slow rate, -.4605 at the normal rate and -.4902 at the fast rate, there was a significant correlation at the .05 level. Significance was increased to the .01 level for the slow rate.

For the vocabulary understanding there was a correlation of -.4925 for the slow rate, -.4272 for the normal rate and -.5175 at the fast rate again yielding a significance at the .05 level. The fast rate again increased to a correlation of .01 significance.

On the auditory discrimination test, a correlation of 0.0603 was obtained at the slow rate, a -.2393 at the normal rate and a -.3333 at the fast rate. There was no statistical significance for any of these relationships.

In assessing the relationship of the vocabulary understanding to error frequency there was a correlation at the -.4189 level for the slow rate, a -.5632 at the normal rate and a -.4799 at the fast rate resulting in a statistical significance at the .05 level for all three rates.

In assessing the relationship of the sentence listening with the error rate, there was a correlation at the -.3688 at the slow rate, -.1316 at the normal rate, and a -.3793 at the fast rate resulting in no statistical significance.

Therefore, the null hypothesis cannot be rejected for the case of the relationship of the normal child's ability to perform on the auditory discrimination tasks and on the sentence listening tasks, to the error frequency. For the case of the vocabulary understanding tasks and the error frequency, the null Ho6 must be rejected. These statistics are presented in Table 8.

(Table 8)

DISCUSSION IMPLICATIONS AND CONCLUSIONS

The purpose of this study was to determine if a difference existed between the performance of the learning disabled and normal child on assessment tools in auditory discrimination, vocabulary listening and sentence listening. The learning disabled and normal child's ability to comprehend stories at three rates of speech was also explored.

Assessment Testing and the Populations: Phase I

In reviewing the implications of this research, a significant difference did not exist between the ability of the learning disabled and normal child to perform auditory discrimination tasks on the Goldman Fristoe Woodcock Test of Auditory Discrimination when controlling for differences in IQ. The mean percentile of the normal population was almost twice that of the learning disabled population. However, this difference was

TABLE 8

Relationship of Errors at Three Rates

to the Assessment Battery for the

Normal Population

	Slow Rate		Normal Rate		Fast Rate	
GFW	corr.	-.0603	corr.	-.2393	corr.	-.3333
	sig.	.403	sig.	.162	sig.	.083
LCV	corr.	-.4189	corr.	-.5632	corr.	-.4799
	sig.	.037	sig.	.006	sig.	.019
LCS	corr.	-.3688	corr.	-.1316	corr.	-.3793
	sig.	.060	sig.	.296	sig.	.055

accounted for by the greater intelligence of the normal population and not due to the difference in performance between the two groups. These results indicated that within both populations there was a tremendous amount of variability in performing auditory discrimination tasks.

The analysis of the Vocabulary Listening portion of the Durrell Listening-Reading Series showed a significant difference in the learning disabled and normal child's ability to perform the task. The standard deviation indicated there was a wider variability within the learning disabled population than that of the normal. The fact that the task included a memory component was important. The child did not simply hear a word and point to the picture representing that word. Instead, the child listened to a stated word. The child was required to recall all available information about this word. This available information then had to be used to assertain certain properties of this word which would enable the child to place this word into one of three designated categories. This skill was much more complex than a simple discrimination or identification task. This ability to process aural information in this complex manner required an ability to associate words to many aspects of meaning and appeared to be very difficult for learning disabled children.

In reviewing the relationship of the sentence listening task on the Durrell Listening-Reading Series to the learning disabled and normal child, there was no significant difference in their performance. The question then becomes, how was this task different from the vocabulary comprehension section. The format of presentation was exactly the same. Categorical

clues were again provided by pictures. The child answered by marking the oval under the picture that represented the category into which the sentence fit. The learning disabled children did have difficulty responding to isolated words and associating them categorically. They were much more like their normal peers when given full sentences. On sentence listening, the mean error for the learning disabled child and normal child was almost identical and the range of errors similar for both groups. This indicated that when the learning disabled child was given more related information, organization of thoughts and response rate increased.

Relationship of Error Frequency at Rate of Speech to Population: Phase II

The learning disabled children had greater difficulty listening to stories and answering questions on these stories than normal peers. The learning disabled child found the fast rate of speech significantly more difficult to respond to than the other rates. Recorded as a statistical significance of .001 the fast rate became an excellent population predictor. Those children who experienced a lot of difficulty recalling information from rapidly presented passages were observed to have the performance characteristics of the learning disabled child.

For the learning disabled child, the frequency of error at the slow rate indicated that adapting to a slow speed was not significantly easier to understand, as previous research suggested. It was not easier for the learning disabled child to comprehend slowed speech when presented at the .5 compression

rate. This inability to adapt to altered rates supports Becker's (1976) findings that educationally at risk kindergarten children have more difficulty regulating the tempo of their performance.

For the normal population, the slow rate of presentation approached significance and resulted in the highest error frequency. Although the .05 level of significance was not quite reached, the question must be raised as to whether the normal child was bored, allowed the mind to wonder and became distracted due to the lack of challenge. His error frequency on the normal and fast rates are only slightly different, indicating the ability to adapt to the difficulty of the task at these rates.

The Relationship Between Assessment Testing and Error Frequency: Phase III

An inverse relationship existed between total error frequency and assessment testing. Therefore, the child's ability to perform auditory discrimination tasks, vocabulary comprehension skills, and sentence understanding was directly related to how well a child could comprehend stories presented at all rates of speed and to answer questions pertaining to these stories. The better a child did on the assessment tests the lower the subject's error frequency.

For the learning disabled child, an ability to discriminate sounds was directly related to how well the child did on any of the three rates presented. At the slow rate, the learning disabled child's discrimination ability was important. His normal peer did not show a relationship of this skill to success at any rate. These results are interpreted as showing that the

learning disabled children who scored low on the measure of auditory discrimination may have been impaired in their performance on the listening comprehension task due to an auditory discrimination deficit. The normal children showed less variability in auditory discrimination and so this factor was not a significant predictor of listening comprehension performance for this group.

Vocabulary understanding was extremely important to the learning disabled and to the normal child at all rates of presentation. Therefore, the better any child was in an ability to respond to vocabulary understanding, the less errors the child had regardless of the rate of presentation of material.

Sentence listening skills as explored were very important skills for the learning disabled child to have but did not seem to relate to the normal child's ability to comprehend speech at various rates. The faster the presentation, the more important these skills were for the learning disabled subject.

In this manner, it was established that the learning disabled child did indeed have specific skill difficulties and that these were related to performance on rate altered situations. The attending skills must increase when auditory discrimination, vocabulary listening and sentence listening are depressed. This raises a question as to whether these areas should become emphasized in the learning disabled child's curriculum. This reinforces the notion that the learning disabled child's efficiency in learning is handicapped by an inability to properly process spoken stimuli.

Conclusion

Further experimentation needs to be made on the components of attention and a more accurate way devised to determine the optimum rate of presentation of speech for each individual. The learning disabled child does perform differently from normal peers at the fast rate of speech. He was more able to respond when presented more normal stimuli. The reason for this inability has yet to be determined.

Techniques in increasing a child's ability to listen and adequately comprehend are lacking from the curriculum of the learning disabled child and yet have proven to be an area needing remediation and improvement.

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